

REMARKS

This Amendment is filed in response to the Final Office Action mailed on April 27, 2005. All objections and rejections are respectfully traversed.

Claims 1-50 are in the case.

Claim 1 was amended to better claim the invention.

Claims 25-50 were added to better claim the invention.

1. At Paragraphs 1 and 4-5 of the Office Action, independent claim 1 was rejected under 35 U.S.C. § 102(e) as being anticipated by Cheng, et al. U.S. Patent No. 6,802,021 issued October 5, 2004 (hereinafter Cheng).

Applicant's claimed novel invention, as set forth in representative claim 1, comprises in part:

1. A method for performing an input/output operation to a storage device from a computer, the method comprising the steps of:
selecting a first data path from a set of data paths between the computer and the storage device;
attempting the input/output operation using the selected first data path;
selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths; and
attempting the input/output operation using the selected next data path.

Cheng discloses a data storage system having multiple paths from a computer to an I/O device, all paths passing through a failover filter. An I/O request is intercepted in an interception operation (column 7, lines 42-44). A decision is then made as to whether the I/O request should be blocked (column 7, lines 55-56).

Blocked I/O requests are rejected, at which point the I/O operation is complete (column 7, lines 62-66, and column 8, lines 11-13).

Unblocked I/O requests are either: 1) manual-path-selecting or 2) automatic-path-selecting (column 8, lines 14-16).

1) If the unblocked I/O request is manual-path-selecting, the failover filter selects the data path specified by the unblocked I/O request, at which point the I/O operation is complete (column 8, lines 26-37).

2) If the unblocked I/O request is automatic-path-selecting, a failure probability is calculated for each data path, and the path having the lowest failure probability is selected for the unblocked I/O request, at which point the I/O operation is complete (column 8, lines 38-65).

In reference to Cheng and in response to Applicant's arguments filed on February 15, 2005, the Examiner stated, at Paragraph 6 of the Office Action, that:

“the I/O operation as a whole included a selected first data path... [and] attempted to use the selected path and failed. The interceptor... re-directed the request to a second path and then used that data path.”
(Office Action dated 4/27/2005, Paragraph 6).

Applicant respectfully traverses the Examiner's characterization of Cheng. Nowhere does Cheng mention the I/O operation “attempted to use the selected path and failed,” followed by, “re-directed the request to a second path.” That is, Cheng is completely silent concerning Applicant's claimed novel *attempting the input/output operation using the selected first data path*, followed by *selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths*, finally followed by *attempting the input/output operation using the selected next data path*.

Initially, in Cheng, the I/O operation was either blocked or unblocked. If blocked, no re-direction or second attempt is indicated. If unblocked, the I/O operation as a whole either manually or automatically selected a path. Regardless of whether the manually or automatically selected path fails, no re-direction or second attempt is indicated.

In sharp contrast, Applicant first attempts a *selected first data path*. Then, in the event of failure of the first data path, Applicant selects *a next data path*. Finally, Appli-

cant's claimed novel invention uses the *selected next data path* in a second attempt to perform the *input/output operation*.

Again, Applicant respectfully urges that Cheng has no disclosure of Applicant's claimed novel selecting *a next data path* in the event of failure of *a first data path*.

At Paragraph 5 of the Office Action, the Examiner cites Cheng, column 2, lines 35-51 and column 9, lines 11-15, as anticipating the present invention under 35 U.S.C. § 102(e). Applicant respectfully points out that Cheng, at those citations, reads:

“to properly balance data path traffic, the number of I/O requests that have been sent along each data path of a plurality of data paths providing access to the computer I/O device is detected, and a failure probability is calculated for each data path paths [sic] based on the number of I/O requests that have been sent along each data path.” (Cheng, column 2, lines 42-47).

“the failover filter then determines which of the detected data paths has the lowest probability of failure. This data path is then selected for use in transmitting the I/O request to the storage device.” (Cheng, column 9, lines 7-16).

Thus, Cheng determines a probability of failure to facilitate choosing a data path but is completely silent concerning Applicant's claimed novel selecting *a next data path* in the event of failure of *a first data path*.

Accordingly, Applicant respectfully urges that Cheng is legally precluded from anticipating the presently claimed invention, recited in claim 1, under 35 U.S.C. § 102(e) because of the absence from Cheng of Applicant's claimed novel:

selecting a first data path from a set of data paths between the computer and the storage device;
attempting the input/output operation using the selected first data path;
selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths; and
attempting the input/output operation using the selected next data path.

2. At Paragraphs 1 and 4-5 of the Office Action, independent claim 10 was rejected under 35 U.S.C. § 102(e) as being anticipated by Cheng.

Applicant's claimed novel invention, as set forth in representative claim 10, comprises in part:

10. A method for maintaining a set of data paths accessible by a set of upper level services of a storage operating system of a computer, the method comprising the steps of:
creating a device instance associated with a storage device;
creating a first path instance associated with a first path to the storage device;
creating, in response to events identifying an addition of a path, an additional path instance associated with an additional path to the storage device; and
deleting, in response to events identifying a removal of a path, a path instance associated with the removed path.

Cheng discloses a data storage system having multiple paths from a computer to a storage device. Each storage device has one associated device object for each data path

providing access to the storage device (column 5, lines 40-45). An intermediate failover system may decrease the probability that a given data path is used for a given I/O operation by adjusting and weighing data values in LinkState, Disable, and Statistics Arbitration cells associated with the given device object (column 10, lines 10-15).

Applicant respectfully urges that Cheng does not show Applicant's claimed novel:

creating a first path instance associated with a first path to the storage device;
creating, in response to events identifying an addition of a path, an additional path instance associated with an additional path to the storage device; and
deleting, in response to events identifying a removal of a path, a path instance associated with the removed path.

That is, Applicant first claims creating a device instance, then *creating a first path instance* which is distinct from the device instance recited prior. Then, Applicant claims *creating an additional path instance* in response to events identifying an addition of a path. Finally, Applicant claims *deleting a path instance* in response to events identifying a removal of a path. Again, note that device instances are distinct from path instances.

Cheng generates a separate device instance for every data path (column 5, lines 40-45), thereby necessitating a masking step to hide duplicate logical device instances from the user (column 8, lines 5-9). "This is a result of each data path to a device causing a separate device object to be generated." (Cheng column 8, lines 2-4)

Cheng makes no reference to *creating a first path instance* or *creating an additional path instance* associated with the device instance, as Applicant recites in claim 10.

Likewise, Cheng uses an intermediate failover system to decrease the probability that a given data path is used for a given I/O operation by adjusting and weighing data values in LinkState, Disable, and Statistics Arbitration cells associated with the given device instance (column 10, lines 10-15), but even data paths which have been “Disabled” or are “LinkDown” have a small probability of being used for a given I/O operation (column 10, lines 16-30). Moreover, the device instance corresponding to the “Disabled” or “LinkDown” data path has not been deleted; it is merely less likely to be used.

Cheng makes no reference to *deleting a path instance* in response to events identifying a removal of a path, as Applicant recites in claim 10.

Accordingly, Applicant respectfully urges that Cheng is legally precluded from anticipating the presently claimed invention, recited in claim 10, under 35 U.S.C. § 102(e) because of the absence from Cheng of Applicant’s claimed novel:

creating a first path instance associated with a first path to the storage device;

creating, in response to events identifying an addition of a path, an additional path instance associated with an additional path to the storage device; and

deleting, in response to events identifying a removal of a path, a path instance associated with the removed path.

3. At Paragraphs 1 and 4-5 of the Office Action, the remaining independent claims 17, 19, and 22-24 were rejected under 35 U.S.C. § 102(e) as being anticipated by Cheng.

As generally discussed above in reference to claim 1, Cheng is completely silent concerning Applicant's claimed novel *using a first data path*, combined with *selecting alternate data paths in response to an error occurring with the first data path*, further combined with *using the selected alternate data paths* to perform the input/output operation, as recited generally in claims 17, 22, and 24.

Likewise, as generally discussed above in reference to claim 10, Cheng fails to disclose Applicant's claimed novel creating, adding, and deleting *path instances* which are distinct from device instances, as recited generally in claims 17, 19, and 23.

Therefore, Applicant respectfully urges that Cheng is legally precluded from anticipating the remaining independent claims 17, 19, and 22-24 under 35 U.S.C. § 102(e), for the reasons provided above in reference to claims 1 and 10.

4. At Paragraphs 2-3 of the Office Action, independent claim 24 was rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Examiner stated, at Paragraph 3 of the instant Office Action: "Electromagnetic signals are deemed non-statutory as a form of natural phenomena."

However, a signal claim directed to a practical application of electromagnetic energy is statutory regardless of its transitory nature. See *O'Reilly v. Morse*, 56 U.S. 62, 114-119 (1853); *In re Breslow*, 616 F.2d 516, 519-521 (CCPA 1980); MPEP 2106(IV)(B)(1)(c).

Claim 24 recites:

24. Electromagnetic signals propagating on a computer network, comprising:
said electromagnetic signals *carrying instructions for execution on a processor for the practice of a method for performing an input/output operation to a storage device from a computer, the storage device having one or more data paths to the computer, the method having the steps,*
selecting a first data path from a set of data paths to the storage device;
attempting the input/output operation using the selected first data path;
selecting, in response to an error in the input/output operation using the first data path, a next data path from the set of data paths; and
attempting the input/output operation using the selected next data path.

Applicant respectfully urges that claim 24 is directed to statutory subject matter, because it is a **signal claim directed to a practical application of electromagnetic energy** regardless of its transitory nature.

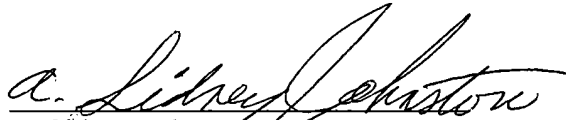
5. Therefore, all independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims, and therefore in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,


A. Sidney Johnston
Reg. No. 29,548
CESARI AND MCKENNA, LLP
88 Black Falcon Avenue
Boston, MA 02210-2414
(617) 951-2500